THE DENTAL Digest

SEPTEMBER 1944

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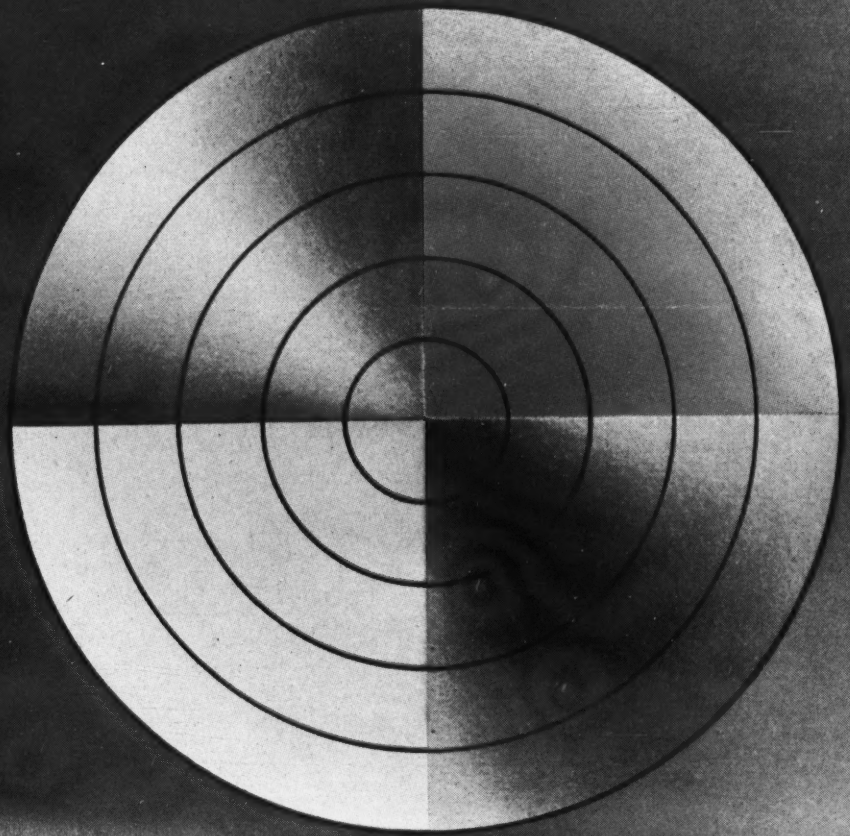

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SUBSCRIPTIONS—In the United States, Alaska, Canada, Cuba, Hawaiian Islands, Mexico, Philippines, Puerto Rico, Central and South America: One year, $3; two years, $4.50; three years, $6. Three-year subscription includes *Visual Education in Dentistry*. (See below.) Elsewhere: One year, $3.75; two years, $6.50; three years, $8.25. Subscriptions payable in advance.

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ADDRESS CHANGES—Please allow two weeks for address changes to become effective; furnish old as well as new address.

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PUBLICATION DATE—The magazine is mailed on the fifteenth of month of issue.

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THE DENTAL Digest

VOL. 50 NO. 9

SEPTEMBER 1944

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About Our CONTRIBUTORS

Captain H. A. Lichtenstein (DC), AUS, received his D.M.D. at Tufts Dental College in 1925. In civilian life, he emphasized prosthetics in his general practice. Captain Lichtenstein wrote for us in November 1943 on Acrylic Tooth Restorations. He presents here A Technique for the Construction of Cast Gold Crowns.

Matthew Lozier, B.S., D.D.S. (Atlanta-Southern Dental College, 1923) has published numerous articles on radiography, diagnosis, oral surgery, and exodontia in dental journals. He limits his practice to oral surgery. This month Doctor Lozier describes A New Technique for Pre-Injection Anesthesia.

George A. Morgan, L.D.S., D.D.S., concludes in this issue his series of three articles on Oral Tumors of Dental Interest by discussing the malignant aspects of these tumors. The two previous articles, which appeared in July and August, considered the Cyst and the Epulis. Additional biographic information was given in those issues of the magazine.

Donald V. Summerville, D.D.S. (University of Pittsburgh, School of Dentistry, 1925) is a test pilot carrying out physiologic research for the Airplane Division of Curtiss-Wright Corporation. Doctor Summerville reviews here the basic atmospheric, physiologic, and chemical conditions present in high altitude flying. Next month he will discuss the dental and medical discomforts associated with flying at altitudes above 8,000 feet.

A Technique for the Construction of Cast Gold Crowns

CAPTAIN H. A. LICHTENSTEIN (DC), AUS

DIGEST

This article describes a technique whereby an investment core is used to produce a cast crown that allows a free space between the tooth structure and the gold, except at the gingival margin.

THE FULL CAST gold crown has no equal in strength and retention for posterior bridges. The gold crown resulting from the technique described here has the following advantages: (1) close marginal fit; (2) strength; (3) absence of thermal shock; and (4) light weight.

Technique

1. Prepare the tooth to a true taper form. The finished preparation should resemble a jacket crown preparation minus the shoulder. A shoulder may, of course, be used if desired. Be certain to eliminate all undercuts, inasmuch as no technique will substitute for an inadequate preparation.

2. Take an individual tooth impression with an accurately festooned copper band, using modeling compound. The impression is packed with a hard stone such as White Marble, Die-Mac, or Die Stone. A tapering root end is necessary.

3. Take an impression of the proximating teeth with a hydrocolloid or an alginate material. Take a bite registration and an impression of the opposing teeth in the same material. A Dicah cardboard bite tray may be substituted for the alginate or colloid impression. In this

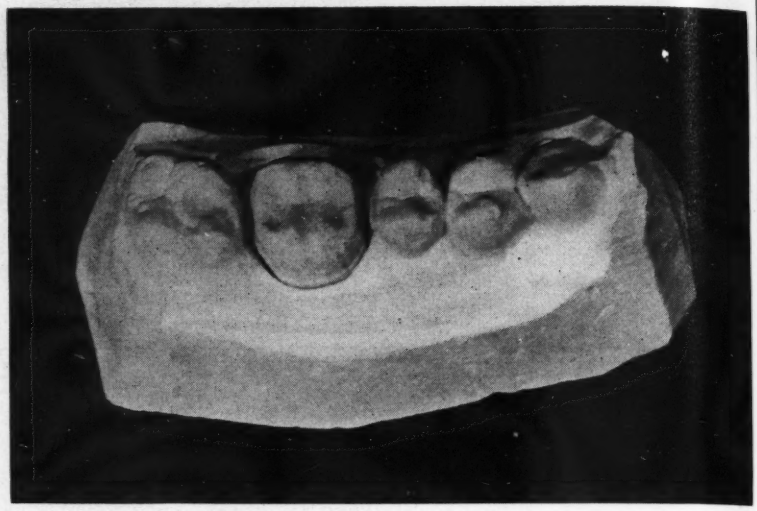


Fig. 1—Stone die seated in model.

Fig. 2—Dicah tray bite. Note floss tied on side of cardboard.

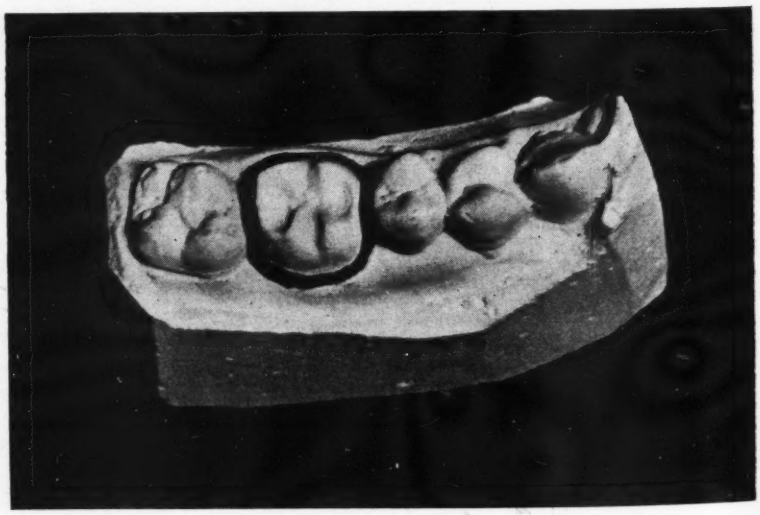


Fig. 3—Die on model; margin wax beaded.

case, punch two small holes into each side of the cardboard tray and lace a double layer of dental floss through the holes before pink baseplate wax is placed into this tray. Have the patient bite into this wax bolus. The free ends of the floss are now hanging out labially. Pull them tightly together and tie them, thereby drawing the palatal lingual side of the tray against the inner surfaces of the teeth, resulting in an accurate wax impression.

4. Pour the stone model of the opposing teeth first, and provide a keyed extension for articulating purposes. When thoroughly set, seat the die (the root end of which has been lubricated) with firm pressure or a hammer blow into its place in the impression. Pour the model, using plaster of Paris.

5. Separate and free the die from the model. Cut the plaster away from around the socket margin to make the gingival borderline of the die freely accessible. Lubricate the die with cocoa butter dissolved in carbon tetrachloride, or a 50 per cent solution of glycerine in water. Wax up the gingival margin of the die with a wax bead, using 18-gauge wax, round or half round. These wax shapes are available commercially, or may be made with a wax gun. Seat the die in the socket, and cover all the die surfaces except the wax bead with thickly spatulated investment material. Coe-Cal casting investment is particularly useful because of its extreme hardness.

6. Lubricate the opposing teeth, and articulate while the investment is still soft. Unless the opposing teeth are lubricated, the model material will absorb water from the investment mix rapidly, and the investment will crumble. Allow the investment to set, preferably over night.

7. Carve the anatomy of the tooth into the investment core, minus the thickness of the finished crown. Add a layer of wax. Fill a small metal container half full of water, and add a sheet of pink baseplate wax which has been cut into small pieces. Melt the wax, holding the flame of a torch or a Bunsen burner near the

Fig. 4—Investment added to die shown in Figure 3.

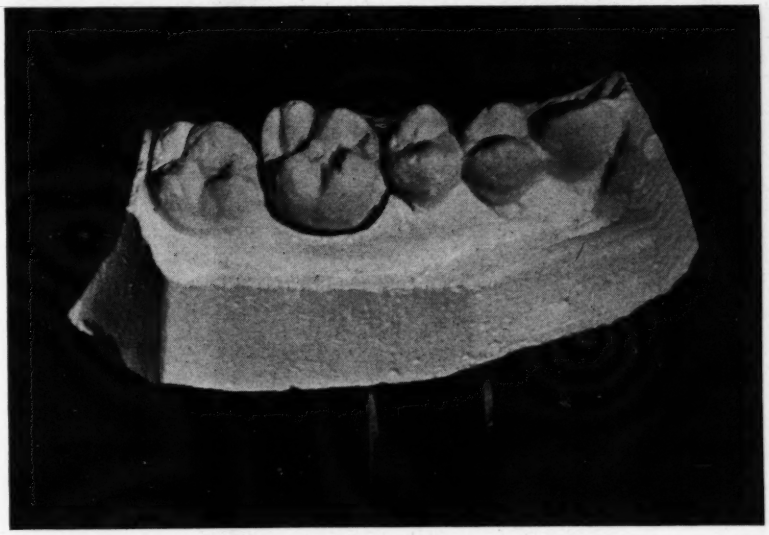


Fig. 5—Investment shown in Figure 4 carved to shape.
Fig. 6—Wax pattern removed from die.

Fig. 7—Investment adhering to inside of wax pattern.

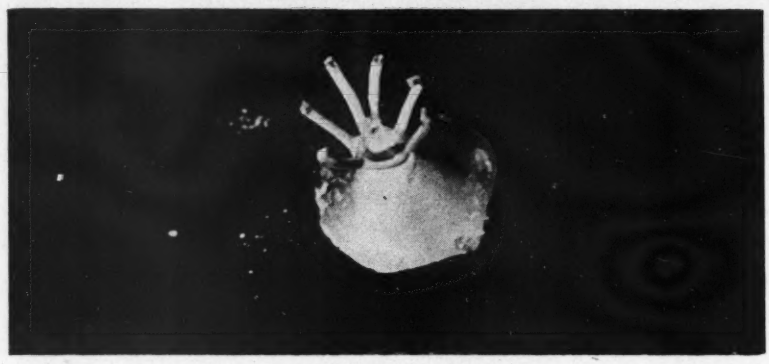
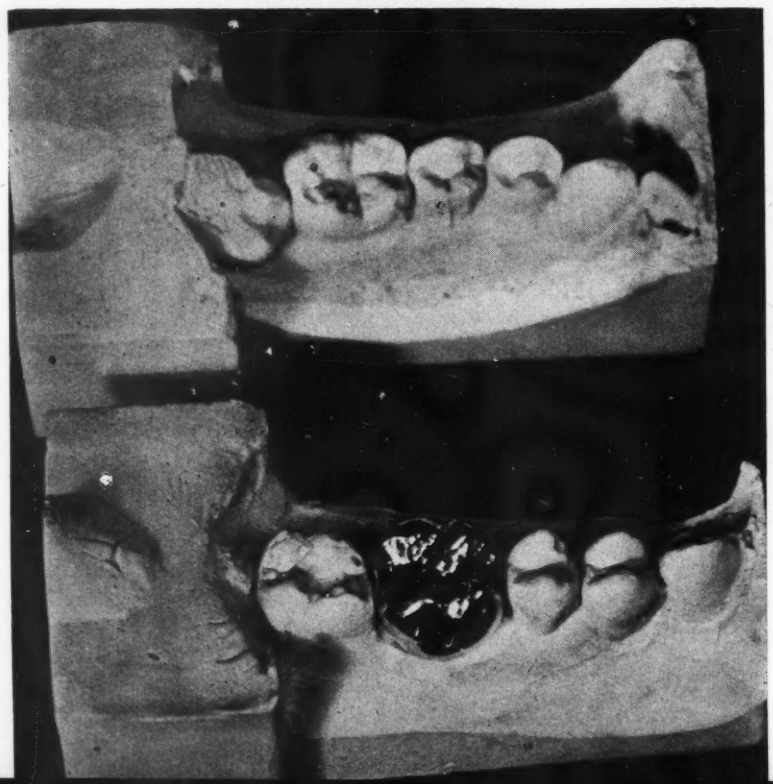


Fig. 8—Multiple sprue button.
Fig. 9—Finished cast gold crown.



top of the container. If heat is applied to the bottom of the container, many bubbles will appear in the melted wax. Dip the die into the melted wax, remove quickly, and shake off the surplus. Repeat until the crown walls are of about a 28-gauge thickness. Dipping the die three times will usually suffice. Trim off the wax that has extended to and beyond the wax gingival bead.

8. Seat the waxed crown in the socket of the model. Cover the cusps of the opposing teeth with three layers of number 60 foil, burnishing and gluing each layer separately. This, plus the forceful seating of the die into the impression, overcomes the usual tendency of the finished crown to be too high. Add wax to the cusps and to the sulci, inasmuch as the dipping will produce even walls but not even occlusal surfaces. Carve the occlusal form as accurately and smoothly as possible. One must remember that it is easier and less costly to trim wax than to trim gold.

During the carving of the investment core, the operator may notice that the die material shows through in some places; this is desirable. Should the investment layer be extremely thick, however, as may be the case in short stumps or badly carious teeth, it will be necessary to drill two small holes through the investment core until the die is exposed. The holes will later produce two gold rods extending from the inside of the occlusal surface. These rods will make contact with the prepared stump and will prevent slipping of the crown beyond the planned margin.

9. After the wax carving and polishing have been accomplished, tap the die several times sharply against a hard surface; this will loosen the crown from the die and will facilitate removal. The investment core usually adheres to the inside of the wax pattern. Sprue the wax pattern, using four to six wax sprues of 18-gauge to 20-gauge thickness. Attach another sprue just below the cusps. The multiplicity of sprues insures a denser casting; the attachment of the sprues below the cusps simplifies the finishing

Fig. 10

Figs. 10 and 11—Plaster model (split) to show cross section of crown schematically.

of delicately carved cusps and sulci. Before investing the pattern, do not fail to moisten the pattern, core, and sprues with a 2 per cent aqueous solution of Aero-sol. The purpose of this application is to reduce the surface tension of the water to a point where bubble-free casting results.

10. Cast. Finish the crown, and polish with the usual materials. A bristle disc held in a motor chuck, with the free use of tripoli and rouge, will finish the occlusal surface faster and better than anything else. You will find that the finished crown will go to place with moderate pressure. The investment core will have provided an excellent cement insulation, and the margin will have a close fit. Because of the small bulk of the crown walls, contraction of the gold upon cooling will no longer be a problem, provided that an expanding investment has been used. The weight of the finished crown will not compare unfavorably with that of a swaged reinforced shell crown.

Editor's Note: The photographs used to illustrate this article were taken by the U. S. Signal Corps.

Fig. 11

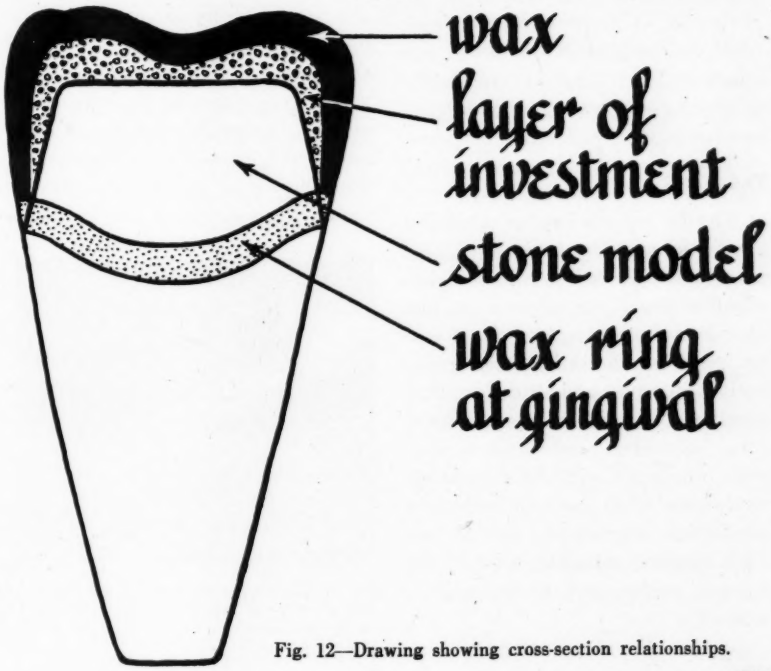


Fig. 12—Drawing showing cross-section relationships.

A New Technique for Pre-Injection Anesthesia

MATTHEW LOZIER, D.D.S., New York City

DIGEST

The theory is advanced that the outer layer of the oral mucosa, which is almost devoid of nerve tissue and which is too thin to permit painless penetration of the needle in making submucosal anesthetic injections, can be anesthetized from the outside. This technique permits complete desensitization of the mucosal and outer submucosal layers before the needle reaches the sensitive submucosal nerve tissue.

THE CHIEF problem in the use of local and conduction anesthesia in dentistry is painless administration. The circle of anesthesia must be complete to introduce the needle into the tissue without inflicting any pain on the highly nervous patient. Although much research and investigation of this problem have been carried out, and numerous drugs and formulas have been offered to the profession, I know of none which could be accepted as completely satisfactory when applied specifically in anesthetization of the oral mucous membrane for pre-injection purposes.

Theorization

Why do we not have a successful anesthetic agent for topical purposes when many proved safe and highly effective drugs are already at our command for inducing instant and profound anesthesia by hypodermic, perineural, and endoneural administration? Why do drugs such as cocain, novocaine, and their derivatives, which act with remarkable effectiveness when used in local and conduction anesthesia, fail to act when applied topically to the oral mucosa, particularly to the palatal mucosa?

The principal specific action of all local anesthetic agents, when injected, is their paralyzant effect upon the sensory nerve endings, nerve branches, and nerve trunks. According to Preyer, a local anesthetic possesses a definite and distinct affinity for the protoplasm of the nerve cell; when the anesthetic solution comes in intimate contact with the nerve tissue, a temporary union of the anesthetic and the nerve tissue takes place to create a lack of sensation, a state of anesthesia. It may be because the action of all local anesthetic agents is confined specifically to the specialized nerve tissue that the oral mucous membrane, especially the palatal mucosa, is not readily affected when a local anesthetic agent, regardless of its chemical formula and potency, is applied to it topically. It is not because of a lack of a suitable anesthetic that our topical anesthesia is so inadequate here, but primarily because the terminal nerve supply in the outer layer of the oral mucosa is quite sparse. If this outer layer of mucous membrane, which is almost devoid of nerve tissue, were sufficiently thick to permit penetration by the very point of a fine, short-beveled hypodermic needle and, likewise, introduction of the anesthetic before the needle strikes the submucosa, the injection of the anesthetic could probably be executed in an entirely painless manner.

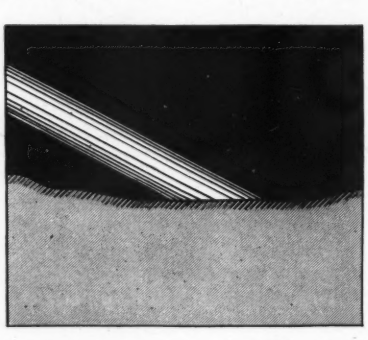


Fig. 1—Place the lumen of the hypodermic needle squarely against the prepared spot on the mucosa.

The abundance of medullated nerve fibers in the submucosa is the explanation for the instant effectiveness of the anesthesia once the drug reaches this layer of tissue. Unfortunately, the outer layer of the oral mucosa is extremely thin, and even a mere engagement of the fine point of the needle in the tissue leads to the penetration of the outer layer of the submucosa and results in trauma and irritation of the submucosal nerve tissue and consequent pain.

The extreme thinness of the outer layer of the oral mucous membrane, however, may be converted into a decided asset. This thinness of the outer mucosal layer will permit ready penetration of a small amount of the anesthetic solution *if it is forced through the mucosa from the outside*. The solution, when thus deposited into the outer layer of the submucosa, effects an adequate degree of insensitiveness to permit a painless initial insertion of the needle. Practical application of this theory has proved its soundness. It was demonstrated that it is possible to propel a small amount of the anesthetic solution painlessly, rapidly, and with ease through the outer layer of the oral mucosa into the submucosa by means of moderate pressure applied to the plunger of the regular type hypodermic syringe after the lumen of the hypodermic needle is properly positioned against the tissue. It was likewise demonstrated that after this is accomplished the needle can be advanced entirely painlessly through the mucosa into the deeper tissue.

Technique

The following technique, which follows the described principle, per-

mits painless insertion of the hypodermic needle for local and block anesthesia. This technique is especially applicable in the most sensitive portion of the oral mucosa, the palatal tissue.

1. Dry the spot on the mucosa where the injection is to be made, using a sponge supported in a small hemostat.

2. Apply a small amount of phenol (carried on a tightly wound, long applicator) to the dried area. The purpose of this application is to sterilize the tissue, to identify the precise spot where the needle is to be positioned, and to numb the mucosa slightly. The escharotic action of this drug, when applied as described, will not cause sloughing, and does not require neutralization. Of course, saliva should not be permitted to contact the prepared area.

3. Place the lumen of a standard length (1½ inch or 1⅝ inch), sharp, short-beveled hypodermic needle (22, 23, or 25 gauge) mounted on a regular type hypodermic syringe squarely against the prepared spot on the mucosa (Fig. 1). Hold the hypodermic syringe in a thumb-on-the-plunger position.

4. Without permitting the point of the needle to enter the tissue, force a few drops of the anesthetic solution slowly and gradually into the tissue (Fig. 2). It is best that the patient understand that the sensation he is experiencing is due merely to the slight pressure. If the lumen of the needle is maintained squarely in position and in close contact with the mucosa, most of the propelled fluid will enter the submucosa, only a drop or two escaping into the mouth.

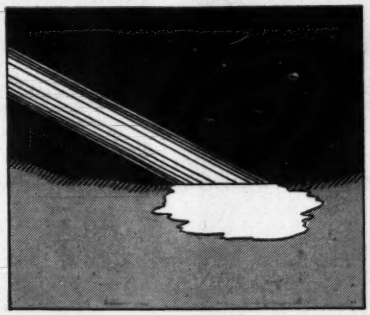


Fig. 2—Without inserting the needle into the tissue, force a few drops of the anesthetic solution slowly and gradually through the outer mucosal layer into the tissue.

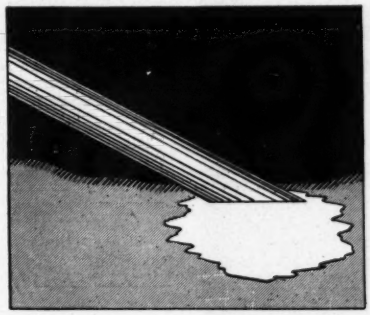


Fig. 3—Insert the point of the needle through the anesthetized mucosa, and deposit a few drops of the anesthetic solution slowly and evenly into the submucosal tissues.

5. The passage of the anesthetic into the submucosa is evidenced clearly by blanching of the tissue. The point of the needle is now permitted to pierce the mucosa, and a few drops of the solution are deposited slowly (Fig. 3).

6. The rest of the injection is carried out in the usual manner, care being taken to deposit the solution slowly, gradually, and evenly to prevent needless trauma of the cellular tissue. The needle should be inserted only into completely pre-anesthetized tissue.

Comments

It will be found that, with this method of procedure, pre-injection anesthesia of the tender oral mucosa can be accomplished quite successfully in the majority of instances. The apprehensive, nervous patient appreciates no other refinement in the operator's technique of anesthesia and surgery more than his ability to introduce the needle into the tissue in a completely painless manner.

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Oral Tumors of Dental Interest: Malignant Aspects*

(Part III)

GEORGE A. MORGAN, D.D.S., Toronto

Leukokeratoses

Leukoplakia is marked by the development of thickened white epithelial patches on the mucous membrane of the cheeks, the alveolar ridge, the tongue, the lips, the floor of the mouth, or the palate (Figs. 1-5).

Many areas of leukoplakia have been observed to break down, ulcerate, and eventually become malignant. Although carcinoma may develop in areas of leukoplakia, many patients with leukoplakia never develop cancer. Patients should, however, be instructed regarding the importance of oral hygiene and the prevention of all forms of irritation of the affected areas. Leukoplakia of the cheek, which generally is situated in the region of the occlusal line, may lend support to the theory of irritation as an etiologic factor (Fig. 3).

The association of malignancy with leukoplakia may be compared with many continued irritations of chronically inflamed epidermal tissue. Thickened leukoplakia lesions of the mouth that do not clear up within a month under the usual home remedies should be considered potentially malignant, and should be referred for competent medical diagnosis and treatment. Extensive leukoplakia involvement of the oral mucous membranes in patients over sixty years of age should be considered potentially cancerous, and should be kept under constant observation.

Fig. 1—Leukoplakia of lateral aspect of tongue.

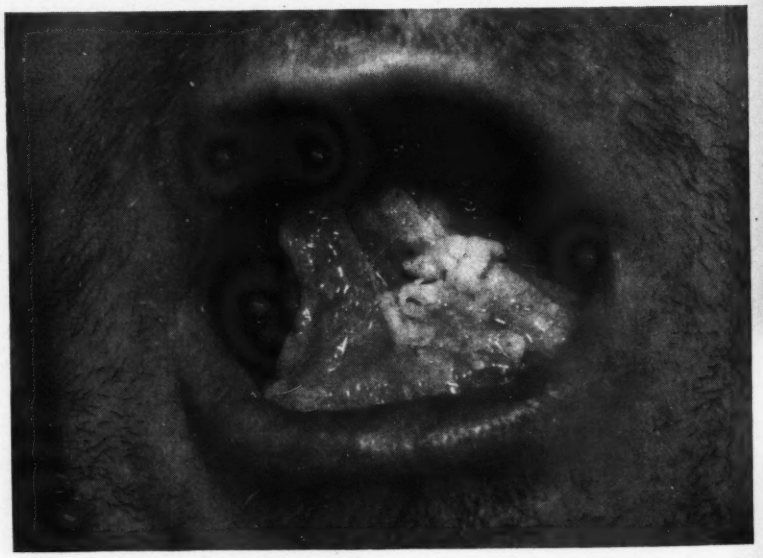


Fig. 2—Leukoplakia of anterior portion of floor of mouth.

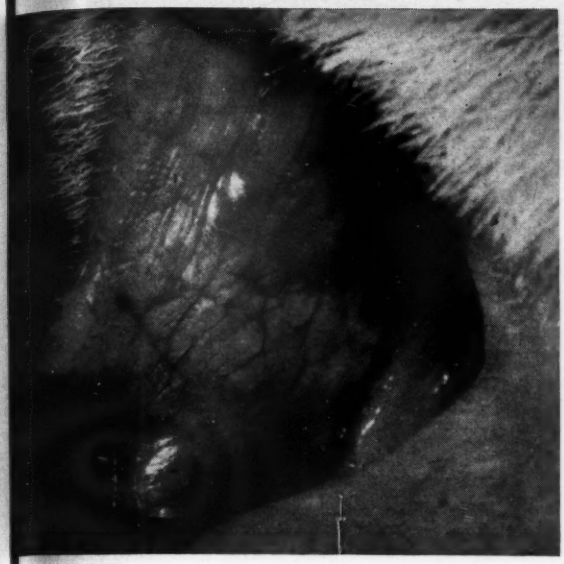
Epidermoid Carcinoma

Carcinoma of the oral mucous membrane is generally epidermoid in character. Its etiology is traceable most frequently to the excessive use of tobacco, alcoholic beverages, and highly seasoned foods; to the presence of jagged or decayed teeth; or to the continued wearing of poorly fitting dentures.

Malignancies of the Mouth

Lip and Tongue—Carcinoma of the lip or the tongue is predominately a disease of males, and occurs most commonly in the age group between forty-five and seventy. Carcinoma of the lower lip is by far the most common (Fig. 6). Its incidence as compared with carcinoma of the upper lip (Fig. 7) is approximately 90 to 1. Carcinoma of the tongue is most commonly observed on the lateral margins (Fig. 8), in approximately

*This is the last in a series of three articles on oral tumors by Doctor Morgan.



3—Leukoplakia of the cheek, the type most commonly found
entists.

Fig. 4—Leukoplakia of anterior alveolar ridge.

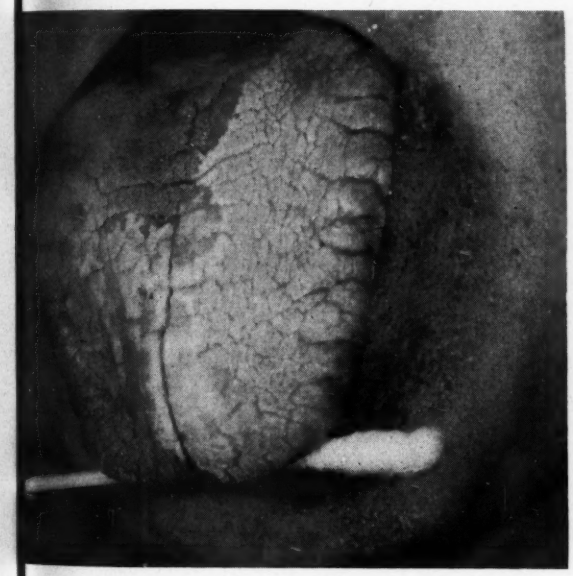


Fig. 5—Extensive leukoplakia of tongue.

Fig. 6—Common coldsore type epidermoid carcinoma of lower lip.

Fig. 7—Epidermoid carcinoma of upper lip.

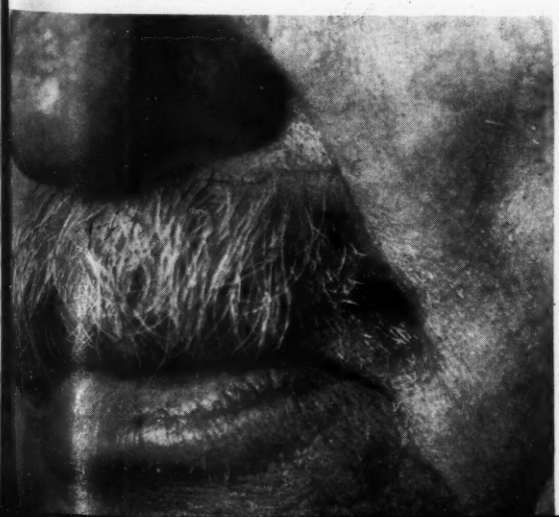


Fig. 8—Epidermoid carcinoma of lateral aspect of tongue.

Fig. 9—Epidermoid carcinoma of base of tongue.

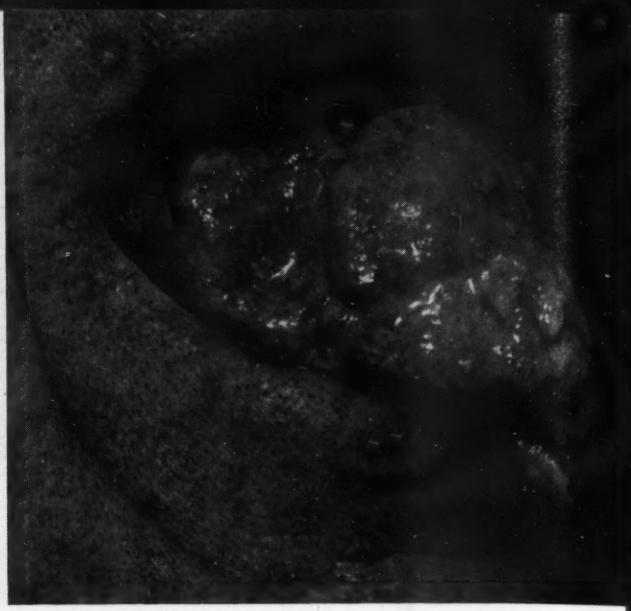


Fig. 10—Extensive epidermoid carcinoma involving base, dorsal surface, and lateral aspect of tongue.

Fig. 11—Epidermoid carcinoma of lateral aspect and tip of tongue.

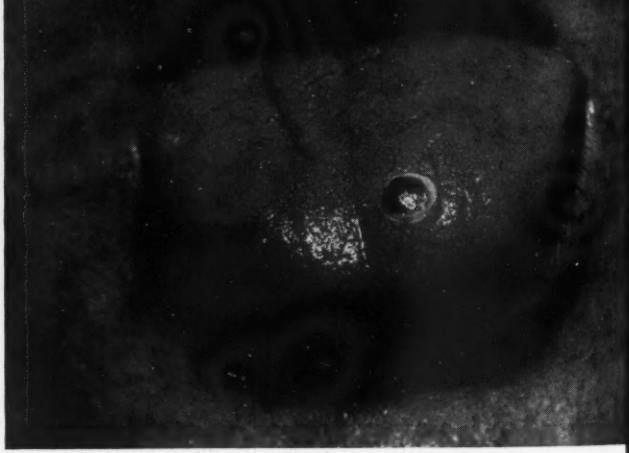


Fig. 12—Early epidermoid carcinoma of tip of tongue.

Fig. 13—Epidermoid carcinoma of under surface of tip of tongue.

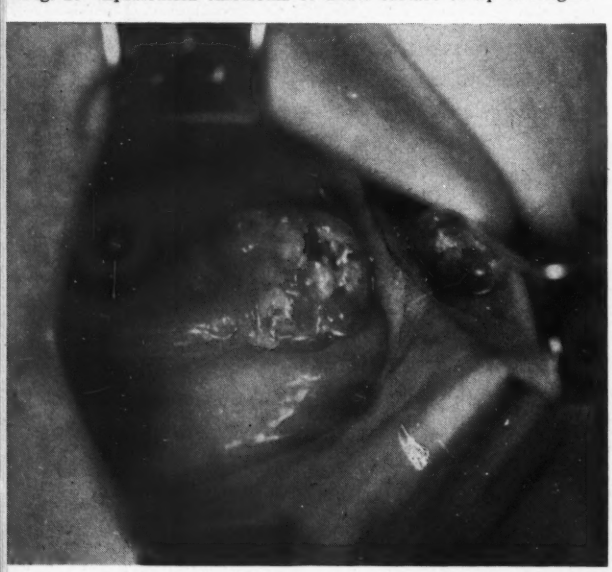
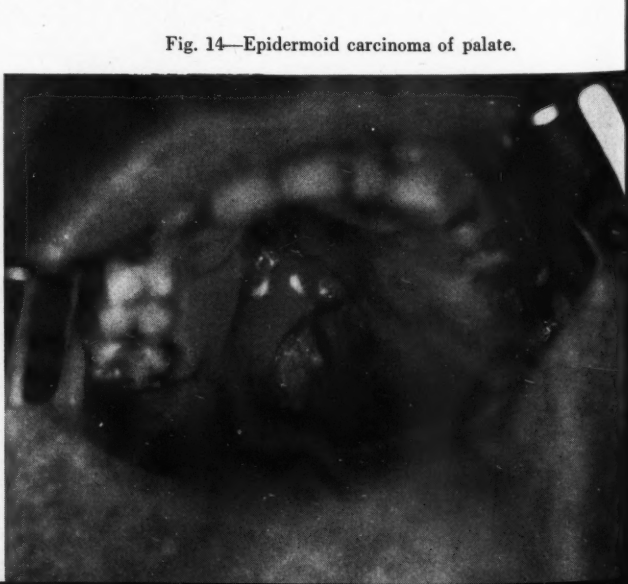


Fig. 14—Epidermoid carcinoma of palate.



60 per cent of the cases; at the base (Fig. 9) in approximately 25 per cent of the cases; on the dorsal surface (Figs. 10 and 11) in about 15 per cent of the cases; and rarely on the tip (Figs. 12 and 13).

Alveolus, Palate, and Floor of Mouth—One of the most troublesome complications to the successful use of radium within the mouth in cases of carcinoma of the alveolus is caused by the proximity of bone. Radionecrosis of bone takes place whether or not the bone is involved by the malignant disease. Wherever teeth are involved, they should be removed prior to treatment (Figs. 14, 15, and 16).

Fig. 15—Epidermoid carcinoma of anterior mandibular alveolar ridge.

Fig. 16—Epidermoid carcinoma of posterior maxillary alveolar ridge.

Comments

1. Oral carcinoma is said to be the third most common malignant disease.
2. The increase in malignant disease is due to the advancements in medical science which are prolonging the life expectancy so that more people are surviving to the cancer age.
3. The necessity of a long course of antisyphilitic treatment for a patient with an ulcerative lesion in the mouth is occasionally responsible for the loss of valuable time in treating the malignancy. Correct diagnostic procedure should, therefore, include biopsy as well as a Wasserman test.
4. Medical-dental cooperation is essential for early recognition and treatment of malignancies.
5. Early recognition followed by prompt and proper treatment places an added responsibility on the part of the dental profession.

170 *Saint George Street.*

THE COVER

It is toothbrushing time at a border region elementary school in guerrilla-held North Shenshi, China. In this haven safe from Jap invaders, Chinese children are being taught the fundamentals of good health. They also receive vocational training.

More than 1000 babies under four in day nurseries, 50 children in the elementary school, and 250 in the technical training academy, are being helped to health and useful citizenship by funds contributed by Americans to local Community War Funds, which support United China Relief through the National War Fund. The latter is a federation of all the major war-related philanthropies, except the American Red Cross.

This year's appeal for funds starts October 4, and ends November 11.

The Editor's Page

WHEN MAN BEGAN to fly at high altitudes, he was required to make compensations for changes in atmospheric pressure, temperature, and the gaseous contents of the atmosphere. Likewise, he experienced physical and emotional sensations as a result of the environmental changes. Man, the terrestrial animal, is not adapted for living under the surface of the sea or at altitudes high above sea level. If his adaptation to altitude is a gradual one, he may be able to make slow compensations for the sensations experienced. But if the projection into the atmosphere is violent and sudden, as in flight, the reactions may come about with terrific speed.

When but a few audacious airmen were flying at high altitudes, their problems were of concern only to themselves and to the physiologists interested in the basic principles of aviation medicine. Now, however, with thousands of young men in military aviation, their physical and mental reactions to high altitudes are of concern to clinicians as well as to physiologists. To prepare dentists to appreciate the basic principles of aviation biology, we begin in this issue a series of three articles on aviation dentistry written by dentists closely familiar with the subject. The first two articles are written by a dentist who is engaged in research for the Curtiss-Wright Corporation. The third article is prepared by a dental officer assigned to the Army Air Forces.

When men fly at altitudes above 7,000 feet, two out of every hundred of them are likely to develop toothache, or aerodontalgia. If these men have deep caries, inflammatory pulp conditions, or root-end infections, they are likely to experience severe pain. Such pain attacking a member of an air crew on a military mission might endanger the military success of the flight. A man with a toothache is not likely to be a good pilot, or navigator, or gunner, or bombardier. A toothache, plus the emotional strain of the military mission, plus the mental and physical phenomena that result from anoxia, form a bad combination. No one will go so far as to say that crashes of planes, inaccurate bombings, or unsuccessful missions, result because the crew men were suffering from toothache, but a toothache may be contributory.

We have a prominent role in the war organization whether we are in civilian practice or in military service. At present we are concerned primarily with the boys in military aviation. The world of the future will see thousands of civilians flying all over the globe at high altitudes. If we are to prepare people for these experiences, we should begin now to think in terms of changes in our technical procedures. We must not allow people to fly who have inflamed or gangrenous pulps, who have root-end areas of radiolucency, who have uninsulated large metallic restorations. This means that we must devise better methods, or at least use the ones that are now available, for the early detection of dental caries. We should develop more exacting pulp tests to determine the degree of pulp vitality. Our electric tests at the present time need much improvement. We must be insistent that people with root-end disease know the hazard of this condition before they attempt flights at altitudes. We will be required to use insulated pulp protectors as routine procedures rather than as occasional procedures in extensive cavities.

Apparently the matter of overclosure of the mandible in its relationship to eustachian tube stenosis has been overemphasized. None of the recent reports from dentists in military service or from those conducting research emphasizes this syndrome. This is not to be interpreted as meaning that overclosure may not produce symptoms.

All other phases of aviation medicine are being given careful study by the Surgeons General of the Army and Navy. We should propose that controlled experimentation be conducted on the dental aspects of aviation medicine. We should suggest the use of the same careful control procedures employing the scientific method that are used in the study of other physiologic and psychiatric aspects of aviation medicine.

Aviation Dentistry: Conditions Present in Altitude Flying

(Part I)

D. V. SUMMERVILLE, D.D.S., Buffalo, New York*

DIGEST

The dental profession can do much to increase safety, alleviate pain, reduce toxic conditions, increase altitude performance, aid vision and fatigue factors, and contribute in general to the future progress of aviation. To protect the human body from the dental and other physiologic discomforts experienced in high altitude flying, one must have a full knowledge of the basic atmospheric, physiologic, and chemical conditions present, and of the responses of the body to changes in these conditions. These factors are reviewed in this article.

Next month, the effects of these atmospheric and physiologic changes on the teeth will be discussed.

APPARENTLY NO specific dental syndrome is associated with high altitude flying. Occasionally, however, flying personnel experience dental discomfort at altitude.[1] Among these discomforts are:

1. Odontalgia.
2. Aeroembolism of the dental pulp.
3. Exacerbation of root-end infections.
4. Thermal sensitivity in teeth carrying restorations.
5. Ear syndromes associated with overclosure of the mandible, which develop on rapid descent.

It is necessary to understand basic physiology and chemistry, and the responses of the human body to changes in altitude, pressure, and temperature, before one can understand the dental discomforts associated with high altitude flying.

To sustain the required coordination between mind and body during flight, it is necessary to maintain a balance between body function and body accommodation. Aircraft are designed to a known stress and strain factor, but people are born with no control over design for any given condition. We must protect the body from its own limitations during flight with a full knowledge of conditions present in altitude flying.

The Atmosphere

Composition of Air—The air surrounding the earth is composed of a mechanical mixture of gases of uniform composition, irrespective of altitude. Nitrogen, oxygen, and carbon dioxide, are the gases in air. Water vapor is present, and is important; it is not a structural part of air but a contained or absorbed part. The structure of air in percentages is as follows: (1) nitrogen, 78 per cent; (2) oxygen, 21 per cent; and (3) rare gases (carbon dioxide, hydrogen, helium, neon, argon, krypton, and xenon), 1 per cent.

Nitrogen and the rare gases are inert. They are contained in the blood plasma in accordance with their coefficients of solubility at body temperatures and atmospheric pressure. Nitrogen is not a factor value for body function. It is inspired and expired to and from the lungs as an inert gas, not entering into any necessary physiologic function.

Carbon dioxide, about 0.03 per cent of the air, is a waste product of respiration, and is required in the blood for control of respiration and heart action. Air containing a high percentage of carbon dioxide is not desirable inasmuch as the body retains the amount necessary for normal function. Any amount beyond this presents a hazard to existence.

Oxygen is required to sustain life in that it is responsible for the oxidation or combustion of foods to supply heat and energy for the body.

Water vapor averages about 1.2 per cent in the atmospheric cloud areas. This percentage gradually decreases with increase in altitude; above 35,332 feet, the air is almost dry.

Atmospheric Pressure—Air has mass and, therefore, weight. The weight, or pressure, exerted by the air through the force of gravity on the earth's surface at sea level is called "atmospheric pressure." This pressure is caused by layer upon layer of air "piled" on the earth's surface, the bottom layers being compressed by the weight of the layers above. The density is greatest, therefore, at sea level, and decreases as the altitude is increased.

Measuring Atmospheric Pressure—Atmospheric pressure is measured by the barometer. The barometer is influenced by the exerted weight of the atmospheric air. Thus, by barometric pressure we mean atmospheric air that has been weighed at a given altitude. Barometric pressure is expressed in: (1) inches of mercury, (2) millimeters of mercury, or (3) pounds per square inch. The terms "millimeters of mercury (Hg)" and "pounds per square inch" will be used in this article. The term "under normal conditions" means "at an established, or predetermined, pressure and temperature." In the United States, the standard atmospheric pressure established at sea level at 15° C. is 760 millimeters of mercury, 29.9 inches of mercury, or 14.7 pounds per square inch. The human body, under normal conditions, has an identical pressure exerted upon it

*From Curtiss-Wright Corporation, Airplane Division, Research Laboratory.

[1] *At altitude* indicates an altitude above 8,000 feet where physiologic factors are recognized in flying.

externally. The total pressure exerted upon the body of an average adult at sea level is about 30 tons.

Partial Pressure—The standard atmospheric pressure at sea level represents the combined pressure, as a unit, for all the contained gases of the atmosphere at sea level, and is dependent on temperature and density. It is obvious that any pressure derived would be the percentage by volume of the total pressure.

Dalton's Law tells us that "in any mixture of gases which do not unite chemically, each gas exerts the same pressure as if it were alone in the volume occupied by all the components; the total pressure of the mixture is equal to the sum of the partial pressures of the gases."

Air contains 20.93 per cent oxygen. If the air is dry, oxygen exerts a pressure of 20.93 per cent of the total pressure of 760 millimeters of mercury or a pressure of 159 millimeters of mercury. This is the partial pressure of oxygen.

A knowledge of partial pressure is important inasmuch as it is responsible for the passage of oxygen through the walls of the air sacs in the lungs into the blood, and from there to the tissues. It must be remembered that as barometric pressure decreases with altitude, so does the partial pressure of oxygen decrease with altitude; therefore, less oxygen can enter the blood by way of the lungs.

The table below shows the relationship between altitude, barometric pressure, oxygen pressure, and oxygen percentage equivalent.

Altimeter—The altimeter in an aircraft is a barometer which is graduated in feet to record height above sea level as expressed by the atmospheric pressure. The true number of feet above sea level may vary from the altimeter reading, inasmuch as the foot gradient reading is scaled to conform to a standard temperature at a given altitude. The actual temperature at any given altitude may vary from the accepted temperature with a change in weather or season. The air expands or contracts upon increase or decrease in temperature, which may vary with altitude. Thus, the altimeter gives the "indicated altitude," the one governing the use of oxygen at high altitudes. "True altitude" is indicated altitude corrected for outside temperature and possible instrument error, and is used in all exact flying.

Temperature Changes — Any atmospheric temperature change that may exist between day and night rarely extends linearly more than 3,000 feet. Apparently there are no changes in the upper atmosphere during this period.

High pressure and low pressure cyclonic areas and seasonal variations do cause temperature changes in the higher portions of the troposphere. A normal, general decrease in temperature exists with increase in altitude until the constant temperature of the stratosphere is reached. This lapse rate is about 2° C. for each 1,000 feet.

Temperature inversions have been noted near the surface of the earth. This inversion is evident at and near the polar regions. The air is often much warmer at 8,000 feet to 10,000 feet than at ground level.

Density Ratio—Density ratio is, in effect, the relation of the actual density of the air at any given altitude to that as established at sea level standards.[2]

Divisions of Atmosphere—The atmosphere is divided into two spheres, the *troposphere* and the *stratosphere*, which are separated by the *tropopause*.

Troposphere: This area extends from sea level to 35,332 feet altitude, according to United States Standards. It contains three fourths of the atmosphere by weight, and the various hydrometers, such as clouds, rain, and snow. The troposphere has a near constant rate of decrease in air temperature of about 2° C. per 1,000 feet as altitude is increased. The temperature gradient and moisture content of the troposphere are closely allied to the phenomena of weather, which occur only in the troposphere.

Stratosphere: This area surrounds the troposphere externally, and extends to hundreds of miles of altitudes. Physically it is characterized by a fairly uniform temperature, and the air is dry.

Tropopause: This is the dividing line between the troposphere and the stratosphere. The height of the tropopause varies with latitude. It is closest to the earth at the poles (approximately 6 miles), and farthest away at the equator (approximately 10 miles).

Physiologic Divisions of Atmosphere—The normal human body can function with ease up to altitudes of 10,000 feet to 11,000 feet for as long as four hours at a time. This function, of course, depends on the physical condition of the airman. Some people may feel the effects at 8,000

Altitude (feet)	Barometric Pressure (mm. Hg)	Oxygen Pressure (mm. Hg)	Oxygen Per cent Equivalent (to sea level pressure)
0	760	159.0	20.93
3.281	670	140.4	18.40
6.562	593	124.5	16.40
9.842	524	109.8	14.50
10.300	506	105.9	13.00
16.404	410	85.9	11.30
18.000	380	79.5	10.00
22.966	320	67.0	8.80
28.000	253	53.0	6.90
34.000	187	39.0	5.16
40.000	149	32.0	4.20
42.000	128	26.7	3.52
50.000	90	18.8	2.40

[2]Diehl, W. S.: Standard Atmosphere: Tables and Data, N.A.C.A. Report No. 218, Washington, United States Government Printing Office, Reprinted 1942.

feet. The altitude of 10,000 feet to 11,000 feet, therefore, becomes the limit of unimpaired performance.

The critical point for physiologic performance is 18,000 feet to 20,000 feet inasmuch as here, after about twenty-five minutes to an hour, anoxia becomes apparent and death may ensue. This then becomes the impaired limit (critical) for physiologic performance. On any flight of over 15,000 feet altitude, oxygen must be used to offset the critical limits as indicated, and to enable the airman to raise the ceiling greatly for physiologic function.

Aviation Physiology

Functioning of Cardiovascular System—The type of shock encountered at altitude with lack of oxygen (anoxia) is the one with which we are concerned. In this, because the cardiac muscle is too weak from lack of oxygen to force blood into the aorta, the pulse rate and the blood pressure are low. The nervous system normally requires a large amount of oxygen inasmuch as the initial impulses arise here. If this impulse to the heart is retarded or impeded, a slower and weaker heart action will be manifested. Changes in heart action are common among airmen because of the various conditions constantly arising. Pilots and air crew must have good hearts. They must be strong to withstand anoxia and the rigors of physical and nervous expenditure of energy at high altitudes.

Anoxia is manifested by a decrease of oxygen in the arterial blood, and an increase of carbon dioxide, resulting in an increase in heart rate and in blood pressure. This is due to the lowered partial pressure of oxygen at high altitude. Among the pilot symptoms in the earlier stages of anoxia, as at 18,000 feet without the effect of supplemental oxygen, are physical exhiliration, cyanosis, slowing up of mental acuity, and a sense of well-being, which entirely belie the dangers that exist. Below 10,000 feet, de-oxygenation of the arterial blood is relatively small; when pure dry oxygen is being used, this general mild lack exists at about 34,000 feet.

Emotional factors are extremely hazardous and may be considered as having greater effect upon the heart than high altitude flying itself. Flying at high altitude is tiring to the entire system because of energy expenditure. A mild exercise at altitude, as the act of piloting, is equivalent to heavy exercise at sea level.

Functions of Respiratory System—It is necessary to know why additional oxygen is needed for maintenance of life in flying past the critical limits of physiologic tolerance. Knowledge of the physics of the atmosphere is equally important, for without this knowledge we would not be able to take the human body to great heights without calamitous results. An adequate knowledge of the atmosphere and its laws enables us to understand physiologic reaction more fully, and thereby to develop necessary tolerance methods in order to harness altitude to our needs.

The gases involved in respiration are nitrogen, oxygen, carbon dioxide, and water vapor. When these gases enter the trachea at sea level, the partial pressure of each is:

Nitrogen .....564.0 mm. Hg
Oxygen .....149.0 mm. Hg
Carbon dioxide .. 0.3 mm. Hg
Water vapor .... 47.0 mm. Hg

The partial pressure of water vapor, 47 millimeters of mercury, is the vapor tension of saturated air at body temperature. The water vapor content is constant at body temperature; thus in all calculations on partial pressure, we must consider it as such. Before any percentage calculation is made for any pressure altitude, the sum total of water vapor, 47 millimeters of mercury, must be deducted from the total pressure.

When air is taken into the lungs from the trachea, it mixes with the air remaining in the lungs. The air in the lungs is lower in oxygen content and higher in carbon dioxide content than is the inspired air (the water vapor content and the nitrogen content remain constant). The partial pressure of the oxygen contained in the air in the lungs must be considered, for upon it depends the actual amount of oxygen that will be taken up by the blood by way of diffusion.

Continuous diffusion of carbon dioxide from the venous blood into the alveoli maintains a constant amount of carbon dioxide in the alveoli. This is important in determining alveolar partial pressure. When pure oxygen is breathed at a high altitude, the nitrogen content is inhaled and exhaled in about equivalent proportions. A marked difference in the percentage of oxygen and carbon dioxide exists, however, between atmospheric and alveolar air, and may be expressed at sea level as:

	Atmospheric	Alveolar
Nitrogen	80%	80%
Oxygen	20%	15%
Carbon dioxide	.03%	5%
Water vapor	varies	47 mm. Hg

The following table shows the partial pressures of the gases in the al-

Alveolar Gases	Breathing Air at Sea Level (mm. Hg.)	Breathing Pure Oxygen at 30,000′ (mm.Hg.)	34,000′ (mm. Hg.)	40,000′ (mm. Hg.)
Oxygen	100	138	100	57
Carbon dioxide	40	40	40	38
Nitrogen	573	0	0	0
Water vapor	47	47	47	47
Total Pressure	760	225	187	142

veoli at sea level and at various altitudes. Note that the partial pressure of oxygen in the alveoli at 34,000 feet, when the airman is breathing pure oxygen, is the same as that at sea level when he is breathing air. At an altitude of 40,000 feet, the partial pressure of oxygen is reduced greatly. At altitudes of more than 40,000 feet, the partial pressure of oxygen decreases rapidly and is beyond the limit of enough uptake of oxygen by the blood to maintain the body in a safe physiologic state.[3]

Life cannot be maintained above 43,000 feet even though pure oxygen is breathed. At this altitude, the atmospheric pressure is so reduced that the alveolar partial pressure of oxygen is insufficient to cause diffusion into the blood. Higher altitudes have been gained but only by using special equipment for maintenance of alveolar partial pressure.

[3]Physiology of Flight: Human Factors in the Operation of Military Aircraft, 1940-1942, Dayton, Aero-Medical Research Laboratory, Wright Field.

Acute Infections Around Mandibular Third Molars

FLIGHT LIEUTENANT ALWIN E. PERKINS, ENGLAND

	Pericoronal	Periapical
Definition (Site)	Infection in soft tissues surrounding crowns of lower third molars.	Infection at apexes of lower third molars.
Etiology	Improper cleaning of retromolar fossa. Biting trauma of semilunar gum flap by upper teeth.	Pulp involvement.
Clinical Manifestations	Face or neck swollen; acute pain; difficulty in swallowing; toxemia; inability to open mouth; fever; anxiety of patient; presence of pus apparent.	Same as for pericoronal; typical manifestations of pulp gangrene.
Pathways for Spread of Infection	*Seat of Infection*—In cellular tissue in retromolar fossa; above cervical tendinous ring. *Direction of Spread*—Type I: Infection spreads buccally to pterygo-mandibular raphe between upper and lower attachments of buccinator muscle. Type II: Infection limited by lingual component of cervical tendinous ring; edema more marked intra-orally on lingual aspect of crown. 1. Along lymphatic channels in cellular tissue (lymphangitis and lymphadenitis). 2. Beyond lymphatic channels directly through cellular tissue (organisms escape with lymph through endothelium of lymphatics). 3. Inflammatory exudate or pus between muscles, fascia and muscles, fascia and bone, or wherever a potential space can be widened under pressure. 4. Result: A cellulitis.	*Seat of Infection*—In periapical tissue; below cervical tendinous ring. *Direction of Spread*—Through either lingual or buccal alveolar plate. 1. Through the bone surrounding the apex of the tooth. 2. Beyond the jaw to facial or other anatomical spaces.
Treatment	Drainage by application of heat, or by incision; extraction *not* indicated during acute stage.	Treat pulp; extraction indicated if infection is within alveolus.
Complications	Post-tonsillar abscess (pus behind the palatoglossus through lingual pathway). Lateral pharyngeal abscess (pus in lateral pharyngeal space through tendinous intersection between the superior constrictor of pharynx and the buccinator).	Same as for pericoronal if infection has gone beyond alveolus.

—Adapted from *The British Dental Journal*, **76**:109 (April 21) 1944.

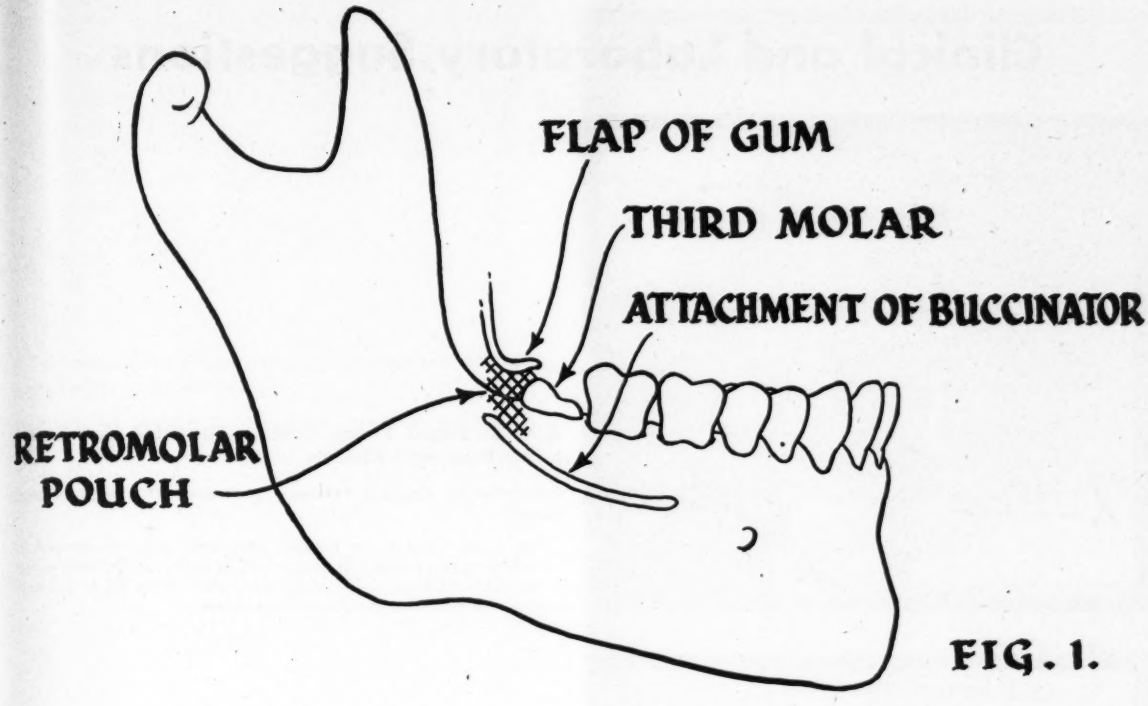
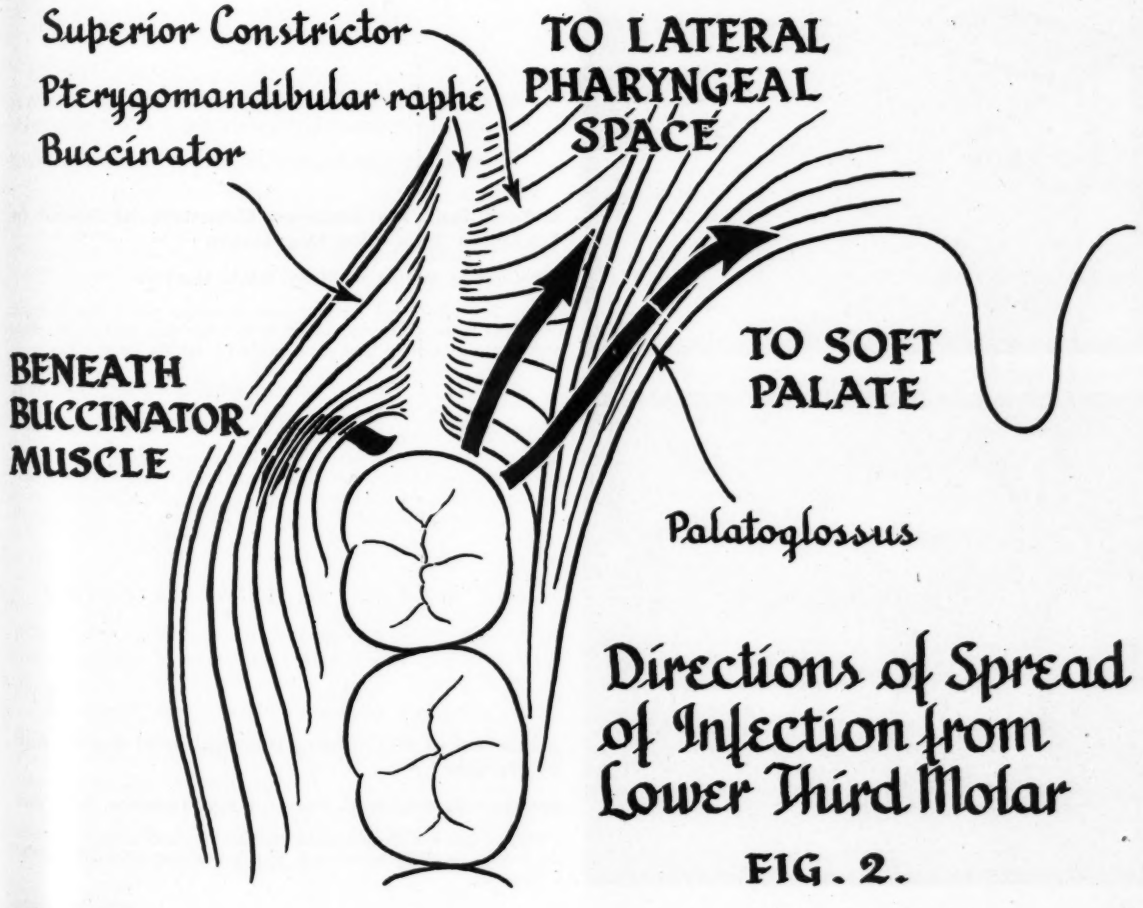


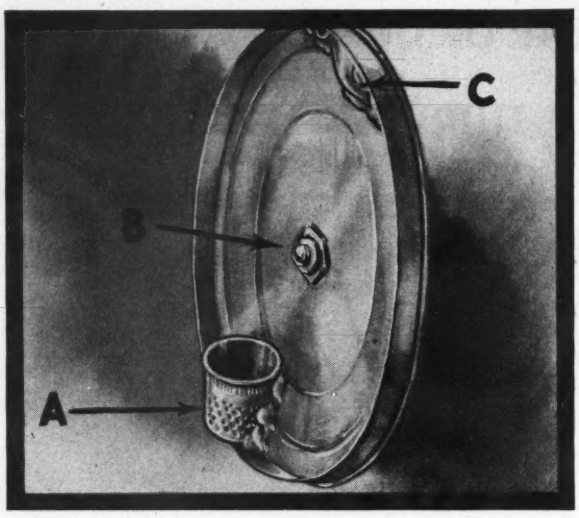
FIG. 1.



Directions of Spread of Infection from Lower Third Molar

FIG. 2.

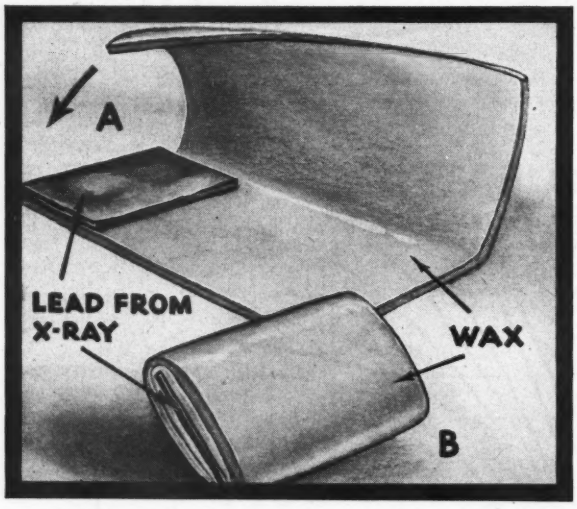
Clinical and Laboratory Suggestions



A Centrifugal Force Casting Machine for Stone Inlay Dies and Models

Submitted by Captain Talmage V. Rogers (DC), AUS, Austin, Texas

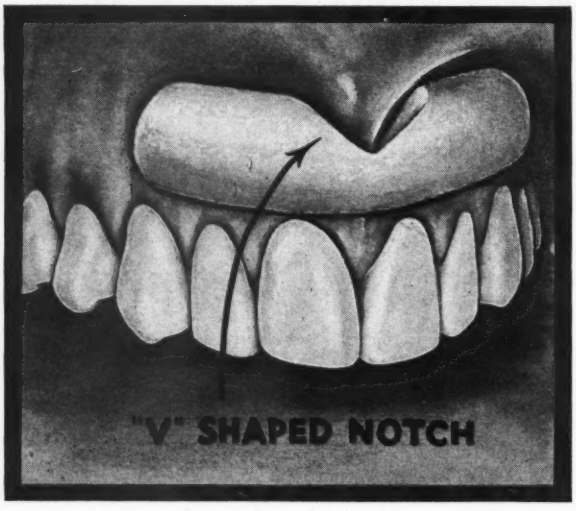
Fig. 1—A, Thimble for holding impression which is wedged in with boxing compound; B_1 attachment of coffee tin lid with screw to chuck; C, fishing sinker soldered to side of tin lid to counterbalance weight of thimble and impression.



A Technique for Assuring Clearness of Detail in Taking a Wax Bite Impression

Submitted by Myrton J. Billings, D.D.S., Brooklyn

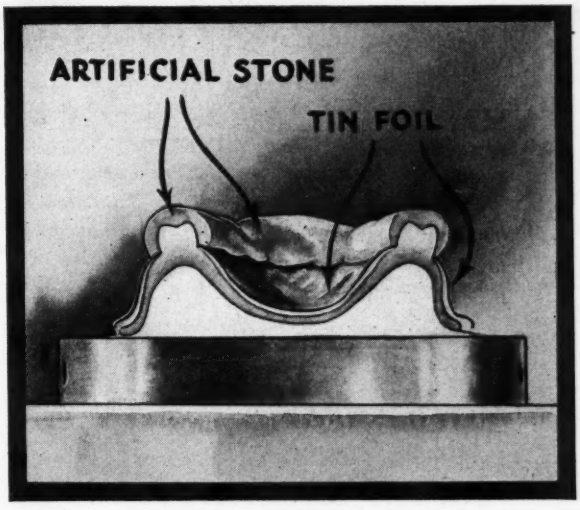
Fig. 2—A, Softened sheet of pink baseplate wax being doubled over lead plate which was taken from x-ray film packet; B, pink wax wrapped around lead plate ready for taking impression.



A Method of Preventing Dislodging of Cotton Roll by Frenum

Submitted by Thomas V. Palmer, D.D.S., Tuckahoe, New York

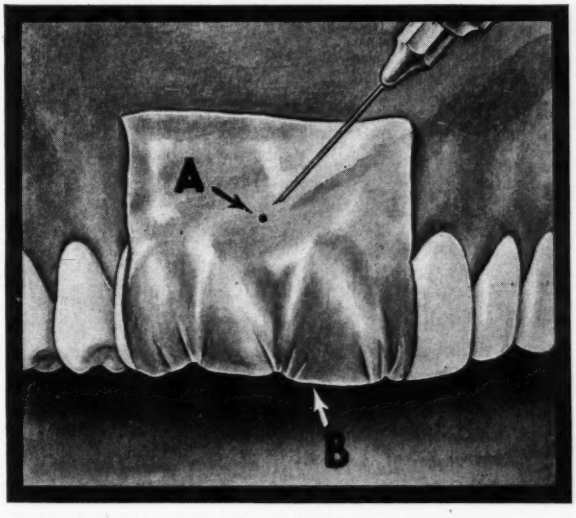
Fig. 3—Cut a V-shaped notch in the cotton roll to accommodate the frenum in all its movements, thus preventing dislodging of the cotton roll.



A Technique for Preventing Displacement of Denture Teeth in Processing

Submitted by Seth W. Shields, D.D.S., Seymour, Indiana

Fig. 4—Paint a moderately thick coating of artificial stone over the teeth before flasking the upper half; allow to harden before final flasking.



A Method of Locating Exact Hole Made Through Alveolus Before Making Interosseous Injection

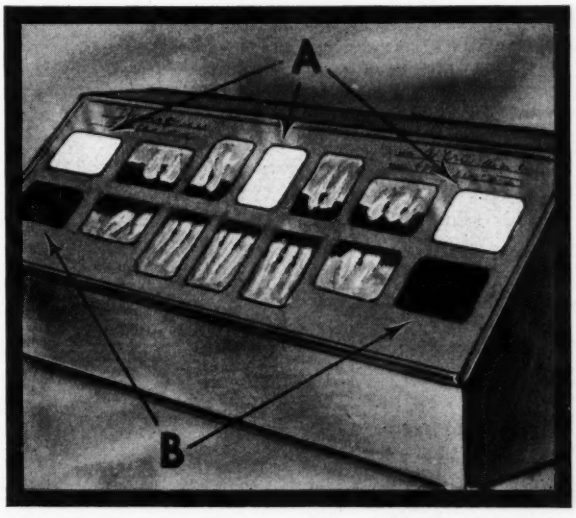
Submitted by L. C. Ziegler, D.D.S., Bethlehem, Pennsylvania

Fig. 5—A, Hole drilled through tin foil (from x-ray film packet) which is burnished over incisal or occlusal edge (B) of tooth and extends along gingiva above point where injection is to be made. Place interosseous injection needle into hole through foil to locate proper channel for injection.

A Method of Mounting Films

Submitted by Esty Kahn, New York City

Fig. 6—A, Blank spaces left on mounts when partial series of roentgenograms are taken; B, filling in the blank spaces with black paper from x-ray film packets prevents light from coming through the celluloid and gives the illusion of a full mouth series.



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4. *Save.* Buy and hold all the War Bonds you can afford—to help pay for the war and insure your future. Keep up your insurance.

A United States War message prepared by the War Advertising Council; approved by the Office of War Information; and contributed by this magazine in cooperation with the Magazine Publishers of America.

Contra-Angles

Nazis Without Teeth . . .

According to DNB, the Nazi news agency, a Doctor Ernst Stuck is the "Reichsfuehrer of Dentists." This is a pale honor these days when all the fuehrers, big and little, are getting nearer to having their mustaches singed. The dental fuehrer has decreed that German patients must not bother German dentists unless the need is urgent, and that dental treatment must be postponed until after the war. It is significant that Fuehrer Stuck does not promise his people gold restorations without limit, or diamond-studded dentures. A few years ago he and the other fuehrers were promising the German people treasures—the plundered treasures—of the world. It is different now. *Lebesraum* has led many Nazis to the little breathing space at the noose's end. Others will follow. The decree by the dental fuehrer probably means that all the able-bodied Nazi dentists are fighting in the army, and that those at home have few materials and supplies with which to work.

After the Nazis are conquered, before the dust from the last bombing has settled, we will be hearing sentimentalists here in the United States pleading for mercy for the German people. We heard that sob story twenty-six years ago. We were told that we were fighting German autocracy, not the German people. The Nazi killers of today were born to those same German people of twenty-six years ago; the people who were without war guilt according to our Sentimental Susies.

Before the world is made safe, every crooked sign of the swastika must be destroyed, every Junker left unhanged after the purging must

(*Continued on page* 418)

(*Continued from page* 416)

be liquidated, and all the fuehrers from Hitler to Stuck must be put away according to the Nazi euphemism, "They are no longer among living people."

You Can Do It Better With Fluorine . . .

Fluorine holds promise for the dental health of the world. This chemical agent added to the community water supply or topically applied to the teeth arrests dental caries. A full-sized program on the subject of fluorine in dental public health is being offered to the profession by The New York Institute of Clinical Oral Pathology on October 30 at the New York Academy of Medicine, 2 East 103rd Street, New York City. Doctor Arthur H. Merritt will preside at the symposium. The speakers and their subjects are:

Doctor Fredrick S. McKay, Colorado Springs, "Fluorine and Mottled Enamel: A Historical Survey."

Doctor H. Trendley Dean, Bethesda, Maryland, "The Epidemiology of Fluorosis and Dental Caries."

Doctor Wallace D. Armstrong, Minneapolis, "The Fluorine Content of Enamel in Relation to Resistance of Teeth to Caries."

Doctor Basil G. Bibby, Boston, "Effects of Topical Application of Fluorides to Dental Caries."

Doctor David B. Ast, New York City, "The Practicability, Efficacy, and Safety of Fluorinating a Communal Water Supply Deficient in Fluorine to Control Dental Caries."

Sugary Pens . . .

Sentimental mush in advertising is disgusting to fighters in foxholes, on the sea, and in the air. The "Dear Mom" copy prepared by writers safe at home has come in for a proper panning by soldiers on the French Front. They took particular exception to the ad in the *Saturday Evening Post* for May 27 that read as follows:

"Dearest Mom: So old Bess has pups again! That reminds me of so much. She had her last litter two years ago—just about this time of

year—when everything was so fresh and new. That's what I want to get back to, Mom—what all of us are fighting to get back to—the world at at home where a fellow can give the sort of welcome he ought to give to a litter of setter pups in the spring. To watch them grow up with all the other new, young things, in a world that's bright and free . . . Your loving son, Bill."

In answer to this sticky copy, three soldiers have written letters that are herewith reproduced with acknowledgement to the *Stars and Stripes*, European edition:

"Dear Mom: Well, here we are in Normandy. I saw a cute little piggy-wiggy today, Mom, and gracious, was he cute. That's what I'm fighting for, Mom, little piggy-wiggies and little ducky-wuckies and little lambi-wambies and oh, just oodles of young, free things to brighten a brave, new world. Your loving son, Joe."

"Dear Mom: We are camped in an orchard not far from Carentan that you've read about, Mom, and there are dairy cows grazing in our orchard and the peasants come right out in their wooden shoes and milk them and, Mom, one of the cows made fertilizer right where I put down my blankets. Golly, Mom, it sure smelt good and reminded me of you and Dad and old Muley. That's what I'm fighting for, Mom, a world in which there won't be no soldiers putting down their blankets right where old Muley wants to make fertilizer. Your loving son, Junior."

"Dear Mom: We are going through some hedgerows toward St. Lo today, Mom, and a German burp-gun got on me and I ducked into a ditch and set off a Tellermine and a Tiger tank ran right over my ditch and a squad of Boche infantry started heaving fragmentation grenades at me and I got to thinking, Mom, of old Bess and her about to have pups again and, Mom, we can't have them pups born into a world that ain't free and bright, can we, even if it's the way you said old Bess got out that night and was bred by that Mongrel next door, so Mom,

OUR BEST HABIT

. . . *says the Axis*

It's American sociability! We love to get together and . . . *talk.* We talk about our work . . . about what we see, or hear from others . . . about latest letters from our boys.

Then others repeat our words to others . . . and others . . . and others . . .

From 10 . . . 50 . . . 200 random phrases about our war production or our boys in uniform, expert Axis agents piece together *one* important military secret which *you* may help betray . . . just by being sociable!

Don't repeat even *little* things about our war program unless they've been published or broadcast. Think *before* you talk!

I got right out of my ditch and fixed that tank good and proper, and also the burp-gun and the Boche infantry, and we will get this here war over, Mom, just as soon as we can for you and Dad and old Bess and a better, brighter world for that little unborn litter. Your loving son, Henry."

How To Live With Your Ulcer . . .

Many of our professional colleagues are sufferers from peptic ulcer. They are in constant companionship with their thermos jugs of milk, and their white powders and blue bottles. When they are upset about some professional matter or have an altercation with a patient, they develop pain in their bellies.

Now comes a new suggestion from an eminent physician at the Mayo Clinic, Doctor Walter C. Alvarez:[1] "Under the circumstances it would seem obvious that the time to start strenuous treatment should always be immediately after a psychic strain has come. Why should one wait until an ulcer has formed or, if present, has eaten its way into a blood vessel or clear through the wall of the intestine? Why wait for disaster when it might perhaps be headed off and prevented?

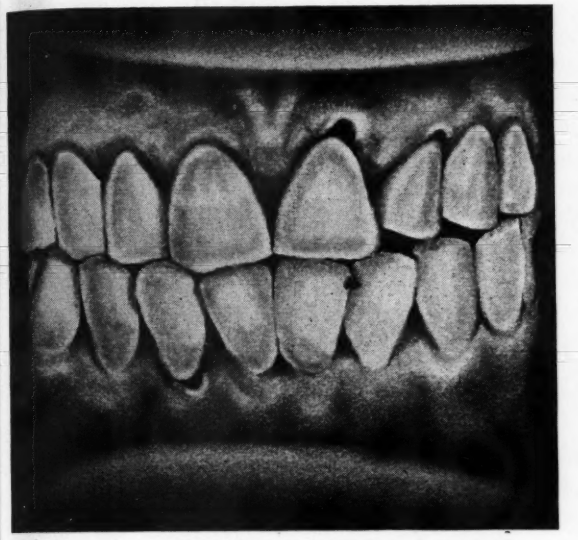
"Furthermore, since it now appears probable that most of the injury to the duodenal mucosa that is wrought by acid comes during those hours between 10 p.m. and 3 a.m., when, in the person with an ulcer temperament, the stomach tends to be empty of food but full of highly acid and unbuffered gastric juice, would it not be logical the evening after a nervous crisis has occurred to begin with either a constant antacid drip or the taking of food and antacids every one or two hours from dinner time on to 2 or 3 a.m.? The patient can easily set an alarm clock to wake himself perhaps at midnight and again at 2 a.m.

"For some years now I have been asking my patients with ulcer to do just this, and already some feel that the treatment has tided them over some bad crises in their lives and kept them from having a flare-up

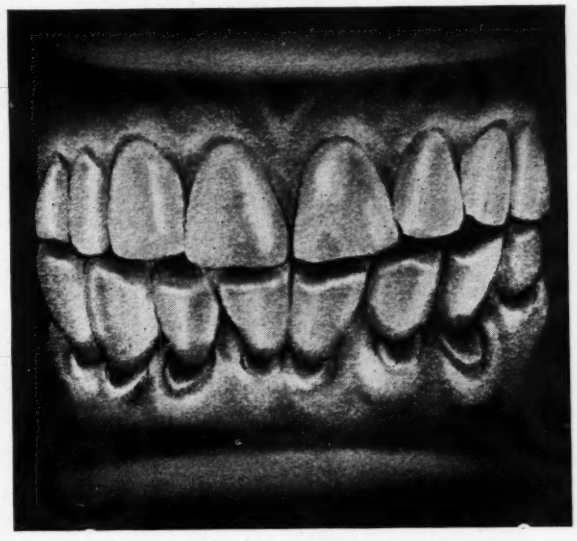
[1]Alvarez, W. C.: How to Avoid Flare-Ups of Peptic Ulcer, J.A.M.A., 125:903 (July 29) 1944.

(*Continued on page* 422)

How Many of Your Patients Brush Their Teeth Correctly?



Laceration of gingival tissues caused by faulty brushing



Wedge-shaped defects associated with improper brushing

Knowing that so few patients understand correct brushing technique, many dentists recommend the use of the D. D. Tooth Brush to simplify scientific brushing. The ingenious *twisted handle* of the D. D. Tooth Brush is set at a forty-five-degree angle, which facilitates proper placement of the brush on the teeth . . . and almost automatically insures stimulating gum massage.

Leading periodontists acclaim the non-skid thumb rest and compact brushhead of the D. D. Tooth Brush. Carefully spaced for maximum interproximal massage, the resilient tufts are of the right length and stiffness for cleaning even hard-to-reach lingual, buccal, occlusal and interproximal surfaces. Whether you recommend the 2-row or 3-row type, your patients will be assured of *an effective aid to oral hygiene designed by practicing dentists . . . who know.*

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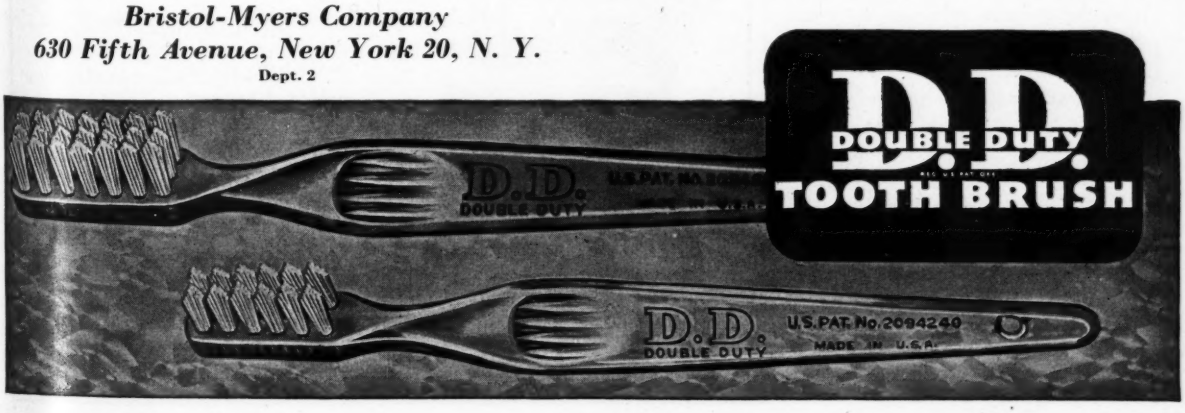


(*Continued from page* 420)

of their ulcer. Dozens of physicians with a tractable type of ulcer have told me that during the intervals in which their life goes peacefully they do not seem to need much dieting or other treatment."

This "alarm ringing" during the silent night, as suggested by Doctor Alvarez, may be hard on other members of the household who are ulcer-free and wish to sleep. The protests may precipitate graver states, even homicide. Before accepting the Alvarez regime, it might be well for our ulcer colleagues to build themselves soundproof bedrooms with food piped in from the refrigerator. If they don't, the wrath of the family may be worse than the pains of the ulcer.

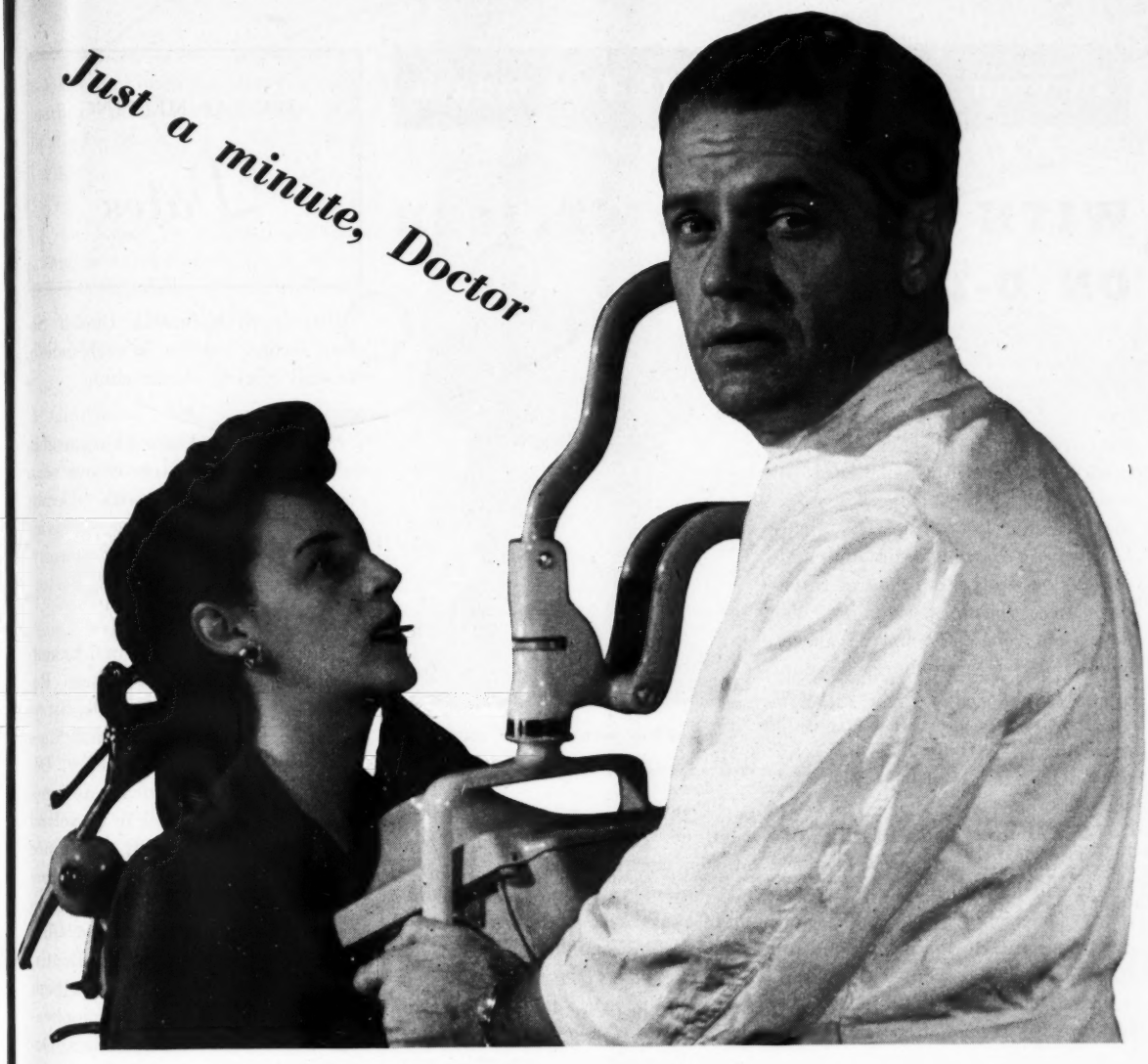
Boy With a Cross . . .

I have known this boy since his pants were short, before his legs grew so long. I have known him since he played with toys on the floor, before he had his adolescent acne. I watched him through sighs of his first love. His father and I were his early drinking companions, long before any of us thought about the war. Now he is twenty-four, and wears the Distinguished Flying Cross on his tunic. He is the pilot of a Flying Fortress. His honors came for what he has done to the Germans. He hasn't told any of us what these exploits were. He probably won't. He is not the sort of guy to boast. His first decoration, the Air Medal, he sent home to his mother without comment or explanation.

This boy is not a killer. He is currently doing a killer's job because it must be done. When he comes home he won't be exactly the same boy who went to war, because war makes grim men of boys. But when he does come back, he won't be a man with a twisted, morbid view toward life. He will go to work; we hope with the rest of us on these magazines. He will marry and have children, and will probably live where he has always lived, in the hill country south of Pittsburgh.

This Boy with the Cross is the only son of Mass, the publisher of this magazine, and his wife, Edith. Mass won't write anything about this boy of his, but he can't stop the rest of us from boasting about Captain John Massol of the American Army Air Forces.—*E.J.R.*

Just a minute, Doctor



Do you ever, on your way to an over-scheduled day at the office, pass a war plant or two where they proudly and deservedly fly an E flag, and do you maybe smile a little. Do you think then, of those ridiculous numbers painted on your office door—your office hours—how meaningless they are, and how you wish they did mean something again.

How many times have you resisted the temptation to get away from it all; and then plunged back again into the exhausting drive of a wartime practice. For, you might ask, who will remember when the war is over what the home-front dentist did. Sure, you closed the ranks as the services took more and more of your colleagues out of practice—but have you a pennant flying high to show it? Sure, you worked day and night to help hold the line of dental health, but has anyone suggested some way of commemorating your efforts? You may have risked your health in the over-burdened job you are handling so well; for which you have been handsomely thanked, no doubt, by your own conscience.

There's a lot more that could be said, but we just wanted you to know that we note with pride what the dental profession is doing in this war—and we're glad that those of you who are using the Model CDX dental x-ray unit are discovering that it can "take it" too.

GENERAL ELECTRIC
X-RAY CORPORATION

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Today's Best Buy — U. S. War Bonds

In your ORAL HYGIENE this month

WITH A DENTAL OFFICER ON D-DAY

—in this month's ORAL HYGIENE— is a vivid personal account of D-Day and the Invasion of France, written by Captain John Shaeffer (DC). It describes in detail the experiences of a dental officer during the battle for the beachhead in Normandy. "Since landing, we have had no dull moments," he wrote, "but the first three days were the most exciting. We have been constantly moving ahead and it looks as if nothing can stop us." Don't miss this thrilling story.

"Getting Along With Patients" is Doctor W. T. Hall's brief but fact-packed article about methods that have succeeded.

"The Dentist as a Guardian of Good Speech," by James F. Bender, Ph.D., tells how, in the correction of speech defects, dentists can be of great assistance to the patient and to other professional men. The author is speech consultant at the National Institute for Human Relations, New York.

"Don't Take Yourself Too Seriously!" is the advice of Doctor Ellsworth A. Bruce, who offers some good-natured counsel to brother dentists who are upset when someone refers to "doctors and dentists."

"Nation's Dental Health Needs Discussed at Ann Arbor" is Doctor Stanley C. Brown's brief outline of an important recent meeting.

Captain John Shaeffer (DC)

"Postscript on Anesthesia" continues the fascinating Wells-Morton controversy.

"American Labor Wants Dental Care" will perhaps stir up a lively discussion. It was written for September ORAL HYGIENE by Alfred J. Asgis, D.D.S., Ph.D., director of the Health Council Institute for Labor Education and Research, and chairman of the Health Council of American Labor Party and Trade Unions.

This month's nine departments include Ask ORAL HYGIENE, Military News, Editorial Comment, Dentists in the News, Technique of the Month, Picture of the Month, How to Kill a Dental Practice, Laffodontia, and The Publisher's Corner.

In your September

ORAL HYGIENE

DENTAL MEETING *Dates*

District of Columbia Dental Society, second Tuesday in each month, Medical Society Auditorium.

•

Massachusetts Alpha Omegans, in service in this country or overseas, please communicate with Doctor Abraham Gurvitz, War Service Committee, Alpha Omega Fraternity, 371 Commonwealth Avenue, Boston.

•

Ohio State Board of Dental Examiners, regular meeting, Western Reserve University School of Dentistry, September 11-13; and at Ohio State University College of Dentistry, October 9-11. The practical examination may be taken either in Cleveland or in Columbus provided due notice is given to the Secretary. The practical examination for dental hygienists will be held October 10 at Ohio State University College of Dentistry. The theory examination for both dental and dental hygiene applications will be held in Columbus, October 12-14. For information write to Doctor Earl D. Lowry, 79 East State Street, Columbus.

•

Florida State Board of Dental Examiners, regular meeting, Seminole Hotel, Jacksonville, September 18-21. For information write to Doctor A. W. Kellner, P.O. Box 155, Hollywood, Florida.

•

The Women's Dental Society of New York City, regular meetings held September 20, October 18, and November 15, Hotel Pennsylvania, New York City.

•

Maine State Board of Dental Examiners, regular meeting, October

(*Continued on page* 429)

(*Continued from page* 421)

2-4, State House, Augusta. For information write to Doctor Carl W. Maxfield, Secretary, 31 Central Street, Bangor.

•

New Jersey State Board of Dental Examiners, regular meeting, October 2-5. For information write to Doctor J. Frank Burke, Acting Sectretary, 150 East State Street, Trenton.

•

University of Buffalo Dental Alumni Association, forty-third annual meeting, Hotel Statler, Buffalo. October 10-12.

•

Odontological Society of Western Pennsylvania, annual meeting, William Penn Hotel, Pittsburgh, October 17-19.

•

Virginia State Board of Dental Examiners, regular meeting, Medical College of Virginia, Richmond, October 24 (instead of September 19 as announced previously). For information write to Doctor John M. Hughes, 715 Medical Arts Building, Richmond.

•

Montreal Fall Clinic, twentieth anniversary meeting, October 25-27. For information write to Doctor M. L. Donigan, 1414 Drummond Street, Montreal, Canada.

•

The New York Institute of Clinical Oral Pathology, first open meeting, New York Academy of Medicine, Hosack Hall, October 30.

•

Connecticut Dental Commission, regular meeting, November 14-18, Hartford. For information write to Doctor C. G. Brooks, Recorder, 302 State Street, New London.

•

Indiana State Board of Dental Examiners, regular meeting, December 11-14, Indianapolis. For information write to Doctor C. A. Frech, Secretary, Gary National Bank Building, Gary.

SALES TO DATE

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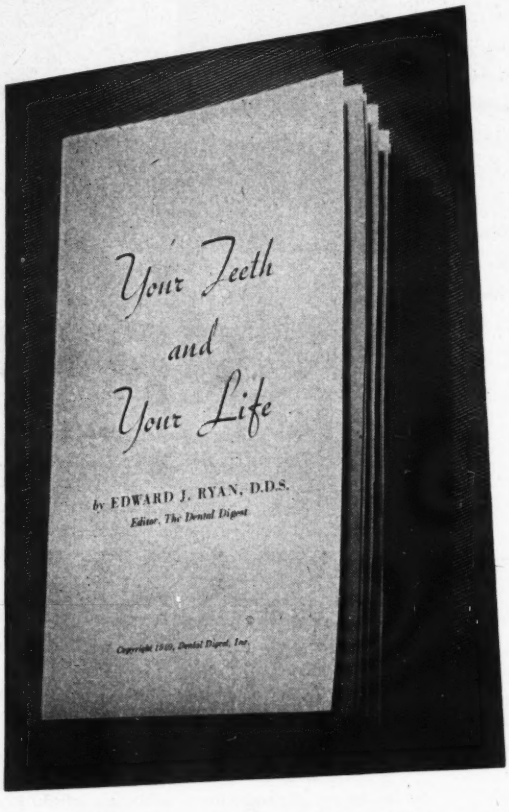

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The demand for the pamphlet "Your Teeth and Your Life" confirms our belief that this material is the answer to your desire for ethical educational material for patient distribution. It contains 16 pages and is illustrated with 10 charts printed in two colors. It will fit your statement envelope and *does not increase the postage.*

"Your Teeth and Your Life" helps you help your patients. It is constructively written in lay language and the charts tell the essential story. It can be used advantageously in many ways. Here are a few: (1) statement enclosure; (2) reception room use; (3) enclosure with patient recall cards; (4) patient distribution upon dismissal; (5) for dental societies and parent-teacher groups.

We could tell you much more about this pamphlet but the better way is for you to see it. The price for 25 copies for trial purposes is only $1.00. Once you see it it won't take you long to decide to use the material in your program. Send the coupon today. You may remit direct, or be charged through your dealer.

PRICE for 100 copies, $3.00

ORDER YOUR SUPPLY NOW

The Dental Digest
1005 Liberty Avenue, Pittsburgh 22, Pa.

Here is $1.00 for 25 copies of Your Teeth and Your Life. I want to determine if this is the booklet I have been wanting for my patients.

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Infectious Mononucleosis in the Army

LIEUTENANT COLONEL ROBERT H. MITCHELL (MC), and
CAPTAIN LOUIS ZETZEL (MC), AUS

Some manifestations of infectious mononucleosis are such that they may be noticed first by the dentist. It is not improbable that such easily observable symptoms as cervical adenopathies, persistent headache, sore throat, fever, and stiff neck, which might be complications during a dental infection, would on further examination be diagnosed as infectious mononucleosis.

This disease, in its protean manifestations, is second only to syphilis in ability to mimic many other diseases. Emphasis is placed here on some of the more important features which we have found of especial interest in a study of twenty-five patients. The age incidence varied from 19 years to 46 years, with twenty-three patients between the ages of 19 and 30.

Admission Diagnoses

The patients were found in various surgical and medical wards throughout the hospital, including the sections of septic surgery, general surgery, neuropsychiatry, general medicine, gastroenterology, and communicable diseases. Admission to these various sections was on the basis of chief complaints and the results of the initial physical examinations (table 1).

TABLE 1—PRESENTING SYMPTOMS

Symptoms	No. of Patients
Headache	17
Sore throat	16
Malaise	15
Fever	14
Adenopathy	6
Abdominal pain	4
Pain in the chest	2
Stiff neck	2

The diagnosis of infectious mononucleosis was made on admission for only eight patients. As noted in table 2, other diagnoses were made, and the correct diagnosis was finally established only after persistent search revealed the typical cells in the peripheral blood, usually in association with adenopathy and significantly positive results of heterophile agglutination tests.

TABLE 2—ADMISSION DIAGNOSES

Disease	No. of Patients
Nasopharyngitis	12
Infectious mononucleosis	8
Cervical adenitis	3
Catarrhal jaundice	2
Sinusitis	2
Measles	1
Pneumonia	1
Malaria	1
Rickettsial disease	1
Pyelitis	1
Vincent's stomatitis	1
Thyroglossal cyst	1

(*Continued on page* 432)

(*Continued from page* 431)

Variability of Clinical Course

Almost half of the patients had symptoms for one week to three weeks before seeking admission to the hospital. The symptoms were for the most part mild.

In cases observed sporadically, infectious mononucleosis may assume the guise of almost any known disease, varying from psychoneurosis to meningitis and including the many serious blood dyscrasias with hemorrhagic phenomena, acute exanthems, hepatitis with jaundice, malaria, and undulant fever.

Lymph nodes were found enlarged, either generalized or in the cervical region alone, in all but one patient at some time during the course of the disease. These enlarged nodes were usually discrete and in chain-like progression. Those involved earliest were in either the anterior or the posterior cervical region. In 52 per cent of the patients, the axillary lymph nodes were palpably enlarged. In only 20 per cent of the patients, however, was the spleen enlarged during the period of our observation.

In 20 per cent of our patients a cutaneous rash either was present on admission to the hospital or developed after hospitalization. This rash was described as a generalized erythematous miliary macular eruption, as a mottled slightly erythematous macular rash over the chest and abdomen, or as a maculopapular erythematous and hemorrhagic rash over the arms, thighs, back, and face.

Acute tonsillitis is not a constant feature in the clinical picture of the disease; however, it was present in eighteen of our patients, with actual exudate over the surface of the tonsils in thirteen. Of twelve patients for whom smears for Vincent's organisms were made, positive results were reported for four. In none of our patients did we encounter a falsely positive Kahn or Wassermann reaction.

Diagnosis

Of paramount importance in the correct diagnosis is an awareness of

the disease in all its variability. Only in epidemic form may there be any consistency of clinical pattern. It is important to emphasize that in addition to the more obvious conditions with which infectious mononucleosis may be confused, it should be looked for in persons with unexplained fever, lymphocytosis, unexplained jaundice, hepatomegaly, splenomegaly, lymphadenopathy, unexplained abdominal pain, meningitis with lymphocytes in the spinal fluid, positive agglutination reactions for undulant fever and for typhoid fever without other confirmation, and falsely positive serologic reactions for syphilis.

Of the laboratory aids available for the diagnosis of infectious mononucleosis, the one pathognomonic finding is an increase in lymphocytes in the peripheral blood, among whose elements are abnormal "leukocytoid" lymphocytes of variable size, structure, and staining properties.

Treatment is usually symptomatic with reliance on the sulfonamide compounds.

—From *War Medicine*, 5:356-360 (June) 1944.

New Dental Bur with Chrome Finish

A NEW type of dental bur with a chrome finish, which is expected to wear at least 50 per cent longer than the steel type now in use, will soon be put into production, according to a report made recently by the Dental Instrument and Bur Industry Advisory Committee to the War Production Board. Laboratory studies on the chrome process have been completed, and actual production will commence, the committee states, as soon as certain specialized machinery is available. It is expected that delivery of the new burs will start within the next two months.

The wearing qualities of the new bur, it is said, will materially reduce the 1944 requirements, which are now 40 per cent above the current rate of shipment. Considerable concern was felt over this discrepancy between 1944 requirements and present rates of shipment, but members of the industry have expressed the opinion that the new chrome bur and the continued expansion of production would make it possible to meet requirements.

The output of dental burs has nearly tripled in the last three years. Military requirements, however, have grown even more rapidly because of the possibility of loss or damage involved in shipments made to combat areas and use under war conditions.

—From Army Dental Corps, *Army and Navy Register*, 65:9 (July 22) 1944.

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ILLUSTRATIONS: Drawings and photographs should be plainly numbered on the backs according to the sequence in which reference is made to them in the article. The author's name should be written legibly with soft pencil on the back of each illustration, and in case of possible doubt, the word "Top" to designate the top of the illustration. In the case of roentgenograms, the negatives are preferred for reproduction; in the case of photographs, glossy prints about 12 by 8 inches in size. Paper clips should not be used on illustrations, especially on negatives. Line drawings should be made in black on white paper that does not blot. Color work must be of a particularly high quality to be acceptable. All illustrations should be clear and distinct and large enough so that details will not be lost if reduction in size is necessary.

EDITING: Authors should not feel that they are being discriminated against or personally criticized when changes are made in the wording or spelling of their manuscripts or if parts are deleted. A minimum of editing is necessary in all cases—if for no other reason than to make grammatical corrections. Sometimes one article will require more revision than another. The reason for revision is obvious: Every magazine has its peculiar style in matters of preferred spelling, in its general tone, in its form of presentation. THE DIGEST favors a compact, terse, simple, style, with outlining wherever possible, and many illustrations. Words, and padded articles with extraneous and irrelevant matter and florid writing, will necessarily undergo considerable editing to make articles conform to our style of succinct, *purposeful* writing. It is, however, at all times the aim of the editors to preserve the author's meaning and to help him make that meaning clear; the editing is not done for standardization as such.

ANONYMITY: Anonymous manuscripts and communications will not be read.